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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/573,591

03/27/2006

Ben Paul Karl Van Hove

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7709

23364 7590 11/19/2009

BACON & THOMAS, PLLC

625 SLATERS LANE

FOURTH FLOOR

ALEXANDRIA, VA 22314-1176

EXAMINER

WU, IVES J

ART UNIT

PAPER NUMBER

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MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/573,591	Applicant(s) VAN HOVE, BEN PAUL KARL	
	Examiner IVES WU	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-17, 19-26, 28 is/are rejected.
- 7) ☒ Claim(s) 18, 27, 29 and 30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

(1). Applicant's Amendments, Information Disclosure Statement (IDS) and Remarks filed on 8/24/2009 have been received.

Claims 1-14 were cancelled before.

Claims 18, 24, 26 and 28 are amended. New claims 29-30 are added.

The rejections of claims 15-28 in prior Office Action dated 5/22/2009 are revised in view of present Amendments and presented together with new claims in the following.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

(2). **Claims 15-17, 20, 22, 24-26, 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al (US 5755855A) in view of Wachsmuth (US 3225517).

As to method for separating gases from a gas mixture wherein the gas mixture to be treated is passed through a membrane separator by means of compressor installation in **independent claim 15**, Baker et al (US 5755855A) disclose separation process condensation, membrane separation and flash evaporation (Title). A process is for separating two low-boiling components of a gas-phase mixture (Abstract, line 1-2). It is shown in the following Figure. It contains compressor 620, condenser 621, heater 622, membrane unit 623.

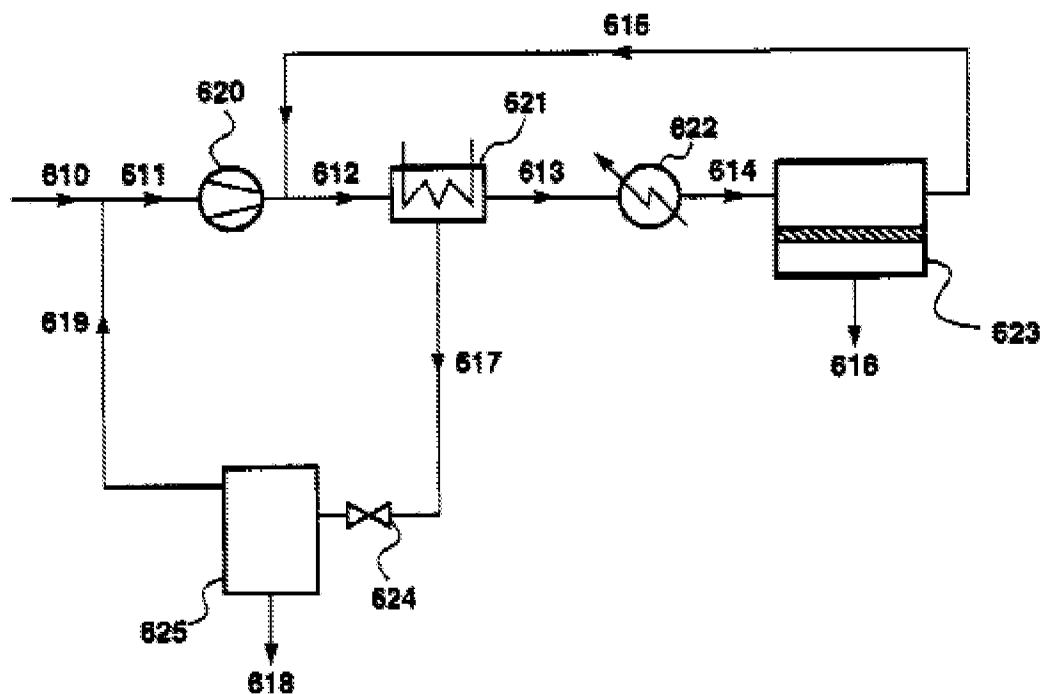
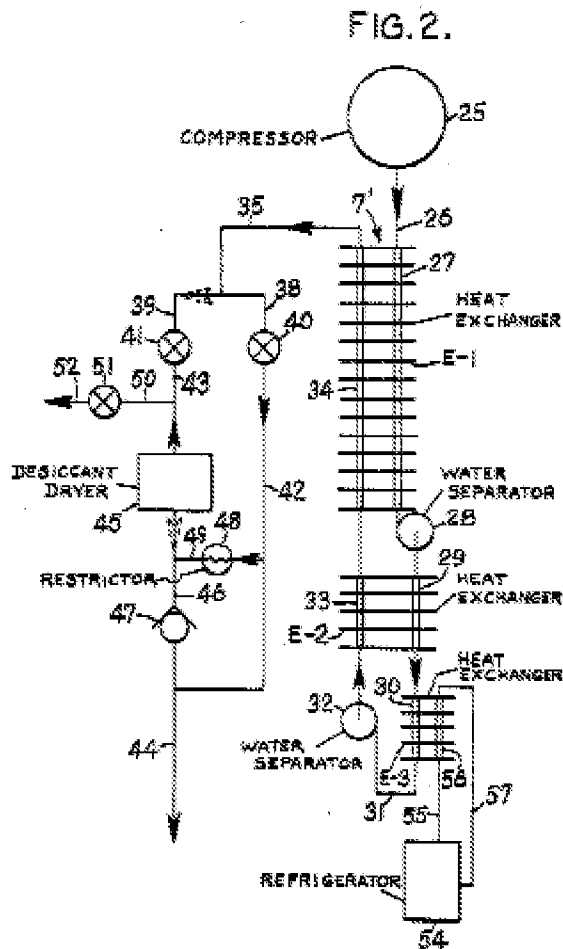


FIG. 6

As to the compressed gas mixture to be treated being cooled at least in the compressor installation to separate condensate from the gas mixture, after which as the compressed gas mixture leaving the compressor installation, the compressed gas mixture to be re-heated before it is passed through membrane separator in **independent claim 15**, as shown in the Figure above which illustrate the process as claimed.

As to step of reheating comprising using recuperation heat of the compressor installation that generates heat available for recuperation heating in **independent claim 15**, Baker et al (US 5755855A) disclose heater 622. Baker et al **do not teach** reheating by recuperation heat of compressor as claimed.

However, Wachsmuth (US 3225517) **teaches** gas drying method (Title). As shown in the Fig.2 below, heat exchanger E-1: the gas stream 35 is reheated by recuperation heat of the compressor 25.



The advantage of use of recuperation heat of compressor is to avoid the external energy resource as well know in the art.

Therefore, it would have been obvious at time of the invention to install the refrigerative type heat exchanger of Washmuth for the heater of Baker et al by circulating the stream 613 in indirect contact with stream 612 as shown in the Figure 6 above in order to acquire the advantage cited in preceding paragraph.

As to during the reheating step, use being made of the heat of the compressed gas mixture at exit of a compressor element of the compressor installation in **claim 16**, as shown in the Figure 2 disclosed by Wachsmuth (US 3225517), it reads on the limitations as claimed.

As to during the reheating step, use being made of a recuperation which is drawn from the compressed gas mixture to be treated while carry out cooling step in **claim 17**, as shown in the Figure 6 disclosed by Baker et al (US 5755855A), the gas to be treated – stream 613 which is carried out in cooling step 621.

As to after cooling of the gas mixture, the gas mixture to be passed through a dryer in **claim 20**, dryer being a cooling type dryer in **claim 22**, As shown in the Figure 2 disclosed by Wachsmuth (US 3225517), water separator 32 and refrigerator 54 which read on limitations as claimed.

As to device for separating gases from a gas mixture comprising a compressor installation having inlet and outlet for a gas mixture to be treated; a membrane separator whose entry is connected to the outlet via supply line; a radiator in the supply line through which the gas mixture to be treated flows and radiator is part of a heat exchanger included in the compressor installation in **independent claim 24**, the disclosure of Baker et al, Wachsmuth is incorporated herein by reference, the most subject matters of compressor, membrane, radiator part of (heat exchanger) and supply line as currently claimed, have been recited in Applicant's claim 15 and have been discussed therein with Figure 6 of Baker et al (US 5755855) to further illustrate the configuration.

As to heat exchanger to be incorporated in a compressed air line between the exit of a compressor element and the exit of the compressor installation in **claim 25**, the disclosure of Baker et al, Wachsmuth is incorporated herein by reference, the most subject matter of location of heat exchanger as currently claimed, have been recited in Applicant's claims 16 and 17 which imply the limitations as currently claimed, and have been discussed therein.

As to heat exchanger being a cooler comprising a cooling type dryer of the compressor installation in **claim 26**, the water separator 28, 32 disclosed in the Figure 2 of Wachsmuth (US 3225517) would meet the limitations as claimed.

As to compressor installation including at least one cooling circuit and wherein the heat exchanger in the supply line to the membrane separator is part of the cooling circuit in **claim 28**,

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the disclosure of Baker et al, Wachsmuth is incorporated herein by reference, the combined teaching have the heat exchanger in the supply line to the membrane separator of Baker et al is part of the cooling circuit of Wachsmuth as claimed.

(3). **Claim 21** is rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al (US 5755855A) in view of Wachsmuth (US 3225517), further in view of Ramsey, Jr. (US 5048548) for the same rationale recited in prior Office Action dated 9/29/2009.

(4). **Claim 23** is rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al (US 5755855A) in view of Wachsmuth (US 3225517), further in view of Daus et al (US 6085549A) for the same rationale recited in prior Office Action dated 9/29/2009..

(5). **Claims 15 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al (US 5755855A) in view of Yoshida et al (US 6865877B2).

As to method for separating gases from a gas mixture wherein the gas mixture to be treated is passed through a membrane separator by means of compressor installation in **independent claim 15**, Baker et al (US 5755855A) disclose separation process condensation, membrane separation and flash evaporation (Title). A process is for separating two low-boiling components of a gas-phase mixture (Abstract, line 1-2). It is shown in the following Figure. It contains compressor 620, condenser 621, heater 622, membrane unit 623.

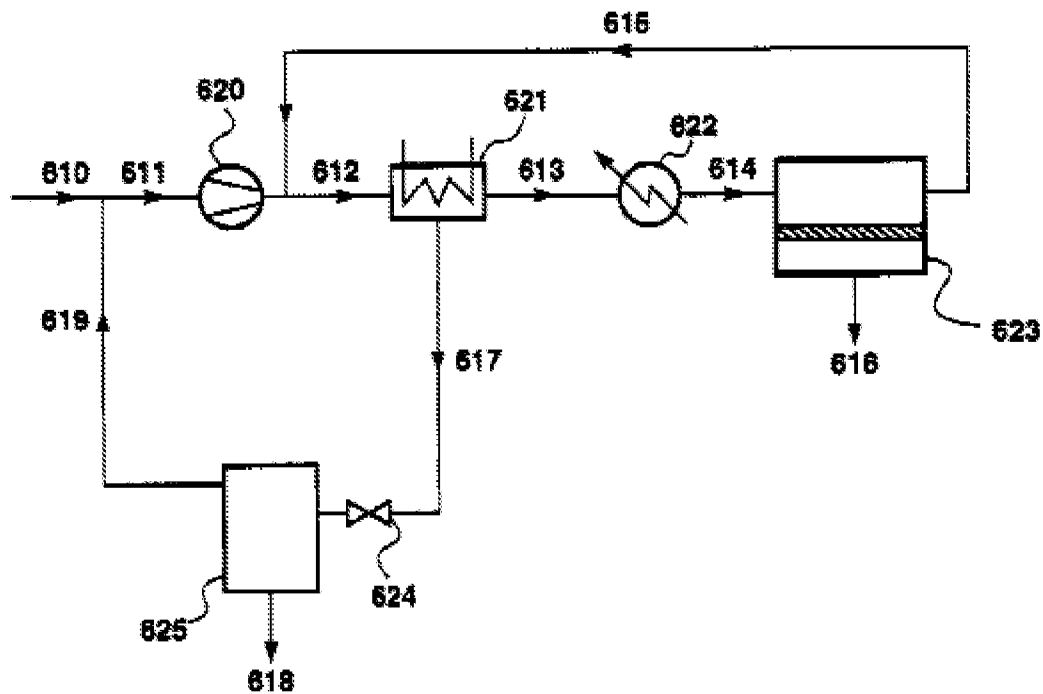


FIG. 6

As to the compressed gas mixture to be treated being cooled at least in the compressor installation to separate condensate from the gas mixture, after which as the compressed gas mixture leaving the compressor installation, the compressed gas mixture to be re-heated before it is passed through membrane separator in **independent claim 15**, as shown in the Figure above which illustrate the process as claimed.

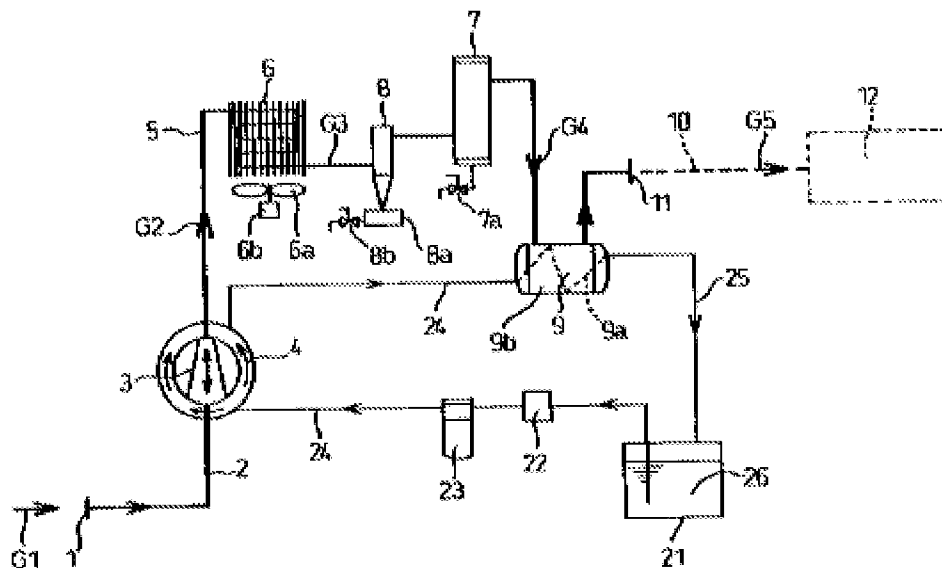
As to step of reheating comprising using recuperation heat of the compressor installation that generates heat available for recuperation heating in **independent claim 15**, wherein the compressor installation is equipped with a cooler for cooling the compressed gas mixture and in which a cooling medium is heated by the compressed gas mixture and thereby contains heat available for recuperation heating, comprising using the recuperation heat of the cooling medium

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during the reheating step in **claim 19**, Baker et al (US 5755855A) disclose heater 622. Baker et al **do not teach** reheating by recuperation heat of compressor as claimed.

However, Yoshida et al (US 6865877B2) **teach** compression feed for high humidity fuel gas (Title). As shown in the Figure below, it includes a cooling conduit 24 for cooling the compressed gas mixture and cooling medium is heated by compressed gas, the recuperation heat is used in heat exchanger 9.

Fig.1



The advantage of using the heat of compressed gas is to avoid external heat source as well known in the art.

Therefore, it would have been obvious at time of the invention to install the cooling medium of compressor disclosed by Yoshida et al for the heater of Baker et al in order to obtain the advantages cited above.

Allowable Subject Matter

(6). **Claims 18, 27, 29-30** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: the compressor has liquid injection at exit of the compressor which overcomes the cited prior arts of the records.

Response to Arguments

(7). Applicant's arguments filed 8/24/2009 have been fully considered but they are not persuasive.

Applicant addresses that in particular, it is respectfully submitted that the Office Action has not sufficiently established that a person having ordinary skill in the art would have replaced the heater 622 of the Baker (US 5755855A) patent with a heat exchanger of the type disclosed in Wachsmuth (US3225517) patent, since it does not appear that a combination would have a reasonable expectation of success (page 9, ¶7, page 10, ¶1). It will be recognized by the law of thermodynamics and the relations of heat transfer that the air in passageway 34 will only ever be heated to a fraction of the temperature of the compressed air in the passageway 27 (page 9, ¶4).

However, the combined teaching of Baker et al (US 5755855A), Wachsmuth (US 3225517) meets the limitations of instant claim 1, since USPTO does not have facilities to conduct the experiments, the burden is shifted to Applicant to prove that combined teaching of Baker et al (US 5755855A) and Wachsmuth (US 3225517) would fail to accomplish the expectation of Baker et al (US 5755855A) in Example 10.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Campbell et al (US 4787919) – Membrane Separation System and Process..

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IVES WU whose telephone number is (571)272-4245. The examiner can normally be reached on 8:00 - 5:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu

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Date: November 9, 2009

/Duane Smith/

Supervisory Patent Examiner, Art Unit 1797